

REMARKS

Favorable consideration and allowance are respectfully requested for claims 16-24 and 34-39 in view of the foregoing amendments and the following remarks.

The rejection of claim 5 under 35 U.S.C. § 112, second paragraph, as indefinite, is respectfully traversed. Claim 5 has been amended so that it is independent. Accordingly, claim 5 includes certain limitations from claim 4 from a process claim rather than a method claim and reconsideration and withdrawal of this rejection are respectfully requested.

The rejection of claims 1, 4 and 5 under 35 U.S.C. § 102(b) as anticipated by WO 00/36046 (Dournel et al.) is respectfully traversed.

Claim 1 is directed to a method that requires the steps of compressing 1,1,1,3,3-pentafluorobutane as refrigerant in a turbocompressor, and allowing the compressed 1,1,1,3,3-pentafluorobutane to expand in heat exchange relation with the material to be cooled.

Dournel et al., on the other hand, teaches a refrigerant that is a mixture of 1,1,1,3,3-pentafluorobutane and at least one non-flammable fluoro compound. (See the abstract). Dournel et al. does not appear to directly teach a method that involves the step of compressing a refrigerant, but even assuming that Dournel et al. does teach compressing a refrigerant, the refrigerant is a mixture including a non-flammable fluoro compound. This is significantly different from the presently claimed invention which requires compressing 1,1,1,3,3-pentafluorobutane as a refrigerant. Accordingly, Dournel et al. fails to teach or suggest each and every element of the invention of claim 1.

Claim 4 is amended to reflect that the refrigerant consists essentially of 1,1,1,3,3-pentafluorobutane. Accordingly, the refrigerant includes 1,1,1,3,3-pentafluorobutane and excludes any ingredients which would materially affect the basic and novel characteristics of that refrigerant. See *PPG Industries v. Guardian Industries Corp.*, 156 F.3d 1351, (Fed. Cir. 1998). No new matter is introduced by this amendment.

A basic characteristic of any chemical compound is its boiling point. The boiling point of a refrigerant is especially important as the refrigeration cycle involves repeatedly evaporating and liquefying the refrigerant, over and over again. Accordingly, a refrigerant with too low a boiling point is not suitable as it would be difficult to condense the refrigerant back into a liquid. Similarly, a refrigerant with too high a boiling point is undesirable as the refrigerant will not readily evaporate into a liquid when it is depressurized. Thus, the addition of any ingredient that significantly affects the boiling point of a refrigerant has a material effect on a basic property of that refrigerant.

The Dournel et al. reference (reviewed as U.S. Patent No. 6,660,709) relates to combinations of 1,1,1,3,3-pentafluorobutane and more than 5% of at least one non-flammable fluoro compound. (See the abstract). Dournel et al. indicates that using 1,1,1,3,3-pentafluorobutane requires precautions due to the flammability of 1,1,1,3,3-pentafluorobutane. Accordingly, a non-flammable fluoro compound is provided such as a perfluorocarbon, hydrofluorocarbon with more than 3 carbon atoms, fluoroamines or fluoro ether. See col. 1, lines 41-44. The reference also indicates that preferred refrigerants include 1,1,1,3,3-pentafluorobutane and a non-flammable fluoro compound, especially where the compound is azeotropic or pseudo-azeotropic. An azeotropic or pseudo-azeotropic mixture of liquids boils together. An azeotropic mixture typically has a different boiling point than the compounds in the mixture taken alone. As a result, the Dournel et al. reference teaches the use of 1,1,1,3,3-pentafluorobutane in a mixture to reduce the flammability problems associated with 1,1,1,3,3-pentafluorobutane.

Dournel et al. does not teach using 1,1,1,3,3-pentafluorobutane alone as a refrigerant, or in a mixture with compounds that do not affect the basic and novel characteristics of the compound, as is claimed. Rather, the fluoro compounds Dournel et al. teaches mixing with the 1,1,1,3,3-pentafluorobutane all result in a material change in the resulting mixture when compared against 1,1,1,3,3-pentafluorobutane taken alone. The very purpose of the fluoro compounds mixed with 1,1,1,3,3-pentafluorobutane as taught by Dournel et al. is to change and avoid the undesirable characteristics of. Thus, not only does Dournel et al. not teach a refrigerant consisting essentially of 1,1,1,3,3-pentafluorobutane as claimed, the reference

actually teaches away from such a refrigerant. Thus, Dournel et al. does not teach this element of claim 4.

Claim 5 is amended to make this claim independent. No new matter is introduced by this amendment. The claim requires a refrigerant that *consists of* 1,1,1,3,3-pentafluorobutane. Thus, the refrigerant does not include ingredients other than 1,1,1,3,3-pentafluorobutane and mixtures of 1,1,1,3,3-pentafluorobutane with other compounds, such as those taught by Dournel et al., are specifically excluded. Accordingly, Dournel et al. does not teach an invention as claimed.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

The rejection of claims 2 and 3 under 35 U.S.C. § 103 as obvious over Dournel et al. in view of Bivens et al. (U.S. Patent No. 5,662,825) is respectfully traversed.

Claims 2 and 3 are dependent from claim 1 and include all of the limitations thereof, adding the step of increasing the rotational speed of the compressor (by 4% in the case of claim 3). In the recent Office Action, Dournel is offered as teaching the elements of claim 1, and Bivens for teachings relevant to the additional limitations provided by claims 2 and 3.

As indicated above, Dournel et al. fails to teach all of the limitations of claim 1. In particular, Dournel et al. fails to teach compressing 1,1,1,3,3-pentafluorobutane as a refrigerant. Bivens et al. does not make up for the failure of Dournel et al. to teach compressing 1,1,1,3,3-pentafluorobutane (HFC 365 mfc) as a refrigerant. Bivens et al. teaches an entirely different compound, namely 1,1,1,3,3-hexafluoropropane (HFC 236fa) as a refrigerant. Thus, neither of the references, either alone or in combination, teaches the step of compressing 1,1,1,3,3-pentafluorobutane as a refrigerant.

Because the references fail to teach each and every element of the claimed invention, the rejection cannot be properly maintained and reconsideration and withdrawal thereof are respectfully requested.

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CONCLUSION


In view of the foregoing, the application is respectfully submitted to be in condition for allowance, and prompt favorable action thereon is earnestly solicited.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #037110.52895US).

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